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now appears that the elements of the orbit computed from the observations of 1846, which extended over only two months, were considerably in error, and that the comet escaped detection in 1851, probably from the inaccuracy of the sweeping ephemeris.

"Occultations by the moon have been attended to as usual. The occultation of *Jupiter* and his satellites on January 2 presented peculiar phenomena, which Professor Challis observed with the Northumberland telescope under very favourable circumstances. The reduced times of observation, the physical appearances of the planet and satellites, and the jovicentric distances of the satellites calculated from the observed times, have been communicated to the Royal Astronomical Society.

"The equatoreal mounting of the Dollond 46-inch telescope, spoken of in the last Annual Report, has been completed by Mr. Simms, and appears to be satisfactorily executed. The apparatus was received so recently that there has not been time to place it on an equatoreal stand, or to form an opinion of the quality of the new object-glass."

On the Eclipse of Agathocles, the Eclipse at Larissa, and the Eclipse of Thales. By G. B. Airy, Esq., Astronomer Royal.

The author, adverting to his paper on the eclipses of Agathocles and Thales, in the *Philosophical Transactions*, 1853, in which the eclipse of Agathocles was used as the cardinal point of reference whereby to correct the motion of the moon's node, remarks that almost immediately after its publication there appeared reason to doubt the propriety of his tacit supposition that the longitude of the moon was sensibly correct. The first reason for extending the supposition of liability to error originated in Mr. Adams' theory of a diminished value of acceleration: other reasons appeared in the publication of Hansen's new Tables of the Sun, and (subsequently) in the preparation of Hansen's new Tables of the Moon. Finally, the author had been induced by the representations, first of Mr. Hind, and afterwards of Mr. J. W. Bosanquet, to examine into the time of the eclipse at the capture of Larissa, of which Xenophon has preserved a singular record; and, adopting Layard's and Capt. Felix Jones's identification of Larissa with Nimrûd, and using Capt. Felix Jones's map (with the correction of an important clerical error, which makes the longitudes too small by 1°), he had been enabled, as he conceives, incontestably to fix the date of that eclipse to −556, May 19. He therefore proceeded to treat the eclipses in the following manner.

There had been computed, with different elements for the places of the Sun and Moon, five different paths of the shadow

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in the eclipse of Agathocles −309, August 14; four in that at Larissa −556, May 19; and four in that of Thales −584, May 28.

In order to reduce these, in the case of each eclipse, to a single result, the following method was used. The horary movements and parallaxes in all the calculations of one eclipse being sensibly the same, each shadow-path might be conceived as a function of the Sun's R.A. and N.P.D. and the Moon's R.A. and N.P.D. at a certain fundamental time for each eclipse. By the application of proper corrections to the Moon's R.A. and N.P.D. in every system of elements but one (Hansen's), all the shadow-paths were made functions of Hansen's Solar Elements, and of different lunar elements. And, measuring graphically the distance of each shadow-path from Hansen's shadow-path, that distance depended only on the difference of the corrected elements of the Moon in the compared shadow-path from Hansen's elements of the Moon. The distance, therefore, could be expressed by the sum of two terms, one a multiple of difference of R.A., the other a multiple of difference of N.P.D. By solution of equations the different multipliers were found, applying to each different eclipse. From these it was easy to express the shift in the position of the shadow-path in terms of changes of Moon's longitude and E.N.P.D.: and, finally, to express it in terms of an alteration in the coefficient of acceleration and an alteration in the motion of the Moon's node.

In proceeding to apply these numbers to the circumstances of the different eclipses, the author remarks that, on account of the extreme narrowness of the shadow and the definiteness of the locality where the eclipse was seen, the eclipse at Larissa ought to be taken as the cardinal eclipse. After discussion of the other eclipses, he arrives at the following conclusions:—

1. The eclipse at Larissa, −556, May 19, is established as a real eclipse at a well-defined point, and may be used for critical reference in deciding on the value of lunar tables as applicable to distant eclipses of the Moon.

2. Professor Hansen's Tables very well represent the phenomena of the three eclipses of Agathocles, Larissa, and Thales.

3. If any change in the elements of the tables is permitted, it must be in the nature of increase of the acceleration and increase in the argument of latitude in the distant ages.

4. It must now be understood that Agathocles passed on the south side of Sicily.

The author then remarks that the best prospect for further test of the Lunar Tables is to be found in the combination of the eclipse at Larissa with that at Stiklastad, A.D. 1030, Aug. 31 (*Astronomische Nachrichten*, Ergänzungs-heft, page 42): as, in both the shadows were very narrow, and the places of observation are perfectly definite; while their interval of time is very favourable for the separation of terms depending on the first power of the time from terms depending on the square of the time.

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